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USE OF SOLAR ENERGY IN THE DESIGN OF ENERGY-EFFICIENT BUILDINGS IN THE CLIMATE CONDITIONS OF UZBEKISTAN.

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Abstract. The residential building, which is being built on the basis of a standard design, was selected to be equipped with solar energy, ie insulated passive heating systems. The observation of heat conversion processes, thermal physical research experiments accumulated by the internal equipment of the fireplace. In addition, a laboratory-designed "Thrombus Wall" will be developed to increase the energy efficiency of the building by conducting thermal and physical experiments and using sunlight.

Introduction: It is known that coal, natural gas and oil products, which are sources of natural energy, are among the sources that will be depleted in the next hundred to one hundred and fifty years. More than 50% of them will be spent on heating, hot water and household services. In addition, due to the rapid development of science and technology, the widespread use of natural energy sources around the world, the sharp increase in carbon dioxide (CO2) emissions from large metropolitan cities and industrial centers, global warming, also has a negative impact on the environment. is a mystery.

Materials and Methods: In our country, special attention is paid to the efficient use of alternative energy sources in order to protect nature, solve environmental problems and achieve economic savings. The Presidential Decree "On measures to further develop the use of alternative energy sources" will serve to further improve the scope of work in this area. The decree clearly defines the legal and logistical basis for the use of alternative energy sources. In particular, the establishment of the International Solar Energy Institute on the basis of the Physics-Sun Research and Production Association of the Academy of Sciences of the Republic of Uzbekistan, the

establishment of a joint venture for the production of 100 MW photovoltaic panels based on the latest technologies in the Navoi Free Industrial Economic Zone. Construction of a 100 MW solar photovoltaic power plant in Samarkand region, incentives for producers and users of solar and biogas energy, tax and customs benefits and advantages will certainly contribute to the sustainable development of the country's economy.

According to the document, the country's climate has great potential for the use of non-conventional energy sources such as solar, wind and biogas. As you know, it is sunny in our country almost every day of the year. These natural conditions are very conducive to the efficient use of renewable energy sources.

In international energy practice, hydro, solar, wind, geothermal, geothermal and biomass energy are recognized as alternative sources. One of the most promising areas is undoubtedly the use of solar energy. By 2100, solar energy will become the dominant source of energy for our planet, according to reputable organizations in developed countries.

Experts say that solar energy is a convenient and simple to use, renewable energy source that is promising in practice. Uzbekistan's total solar energy potential is 50,973 million tons, and its technical potential is 176.8 million tons. is estimated to be equal to. This means that the annual value of solar energy in our country is much higher than the cost of hydrocarbons. Currently, only 0.3% of solar energy is used. The use of solar energy is important for its use, resources, environmental friendliness and ease of use. Solar devices are very useful in providing electricity and heat to areas far from centralized electricity and heating systems. Also, low-potential heat from solar energy, water softening in deserts, drying of agricultural products, heating of greenhouses and living quarters, hot water supply, ventilation and cooling of buildings, pure metals, heat-resistant materials can be used.

Uzbekistan has significant experience in conducting scientific and experimental research in the field of alternative energy sources, especially solar energy. Developments in this regard have been underway for several years. The Republic has established a unique scientific-experimental center in Central Asia - the Scientific-

Production Association "Physics-Sun" of the Academy of Sciences, the results of which have been recognized worldwide.

At present, all buildings are heated by natural heat sources. However, the planet's natural thermal energy sources are declining and their cost is increasing year by year. It is advisable to replace all or part of the newly generated energy resources with solar energy to supply energy to buildings and structures. These include heating or cooling, and hot water supply.

Of course, the cost of heating equipment and its study is much higher today

high. However, given the fact that sunlight is free and their source is inexhaustible, in 2-3 years the equipment for processing sunlight will cover itself and can be used until it is fully developed. [M]

It is possible to predict the future and prospects of developments in this area. By 2025-2030, high-efficiency solar systems will emerge, and their payback period could be drastically reduced. That is why the use of non-conventional energy sources, including solar energy, is becoming more widespread in Uzbekistan, as well as around the world. Another important reason for this is the environmental situation.

The ecological situation requires architects and builders to think anew. Modern energy is becoming more traditional today, depending on the energy carrier, and has a negative impact on the environment in the energy supply of buildings and cities in general.

It is known that solar energy is mainly used for the supply of low-power domestic hot water and heating. Global low-energy heat production will reach 5 * 106 Gcal in the near future. Phytoelectric devices have a total global capacity of 500 MW.

An analysis of published Internet data shows that energy demand is driving the 4th generation of new energy sources around the world. These methods allow for efficient energy supply of buildings - the installation and installation of solar panels at low cost.

There are two areas to consider in development:

production and use of limited-capacity solar power plants for power supply to small autonomous consumers;

creation of limited-capacity solar power plants in the northern and desert regions;

This will solve the problem of global energy balance through the use of new energy sources.

How to use sunlight in buildings? Here are some rules:

the effect of sunlight on the building or receiver surface. In order to receive solar energy, the receiving surface must be on the south side, which means that the width of residential buildings is efficient;

passive use of solar radiation by receiving direct light from glass windows (windows, stained glass windows, showcases); indirectly used through barriers, walls, roofs, winter gardens.

active use of solar radiation is received by special equipment - solar collectors, solar phytoelectric devices used on the ground and carried out by means of transmission;

- when building a new building or reconstructing an old one, new energy-efficient devices and structures are added to the building, which artificially change the speed of wind flows;

- The installation of integrated systems for use at different intervals without solar energy and wind energy will help to make efficient use of alternative energy in the organization of the living environment;

- The architectural and design solution of solar energy building depends on the technology of application of solar systems. The plasticity of the tar solution determines the direction of wind and the maximum effective direction of sunlight retention.

What rules should be followed when designing or reconstructing buildings using alternative energy-efficient construction methods?

First of all, it is necessary to take into account the climate of the region and the meteorological conditions of a particular construction site, the solar area is illuminated by sunlight.

- the project must take into account the conditions of energy saving, the conditions of optimal reception of sunlight by the building;

- the power receiving parts of the equipment must be routed efficiently;

- When constructing or reconstructing residential buildings, it is necessary to try to create an energy-efficient building in order to use alternative energy supply in them, which can reduce heat loss in the building through a volumetric solution and enhanced heat protection. An ecological approach to the creation of a residential environment is needed;

- production development; Simplifying the design of alternative systems will reduce the cost of power from alternative systems.

Today's energy base is coal, oil and gas, as well as river energy, which account for only 5% of the world's energy reserves. However, they can meet 90% of the world's energy needs.

According to estimates, even at today's level of energy demand, energy sources will last another 100-150 years, depending on the length of the fuel in the fields.

As can be seen from the table, solar radiation or diffusion reserves can be used anywhere on Earth. The radiation power reaching the ground is 2 MWh / m2 per year, so no floor space is required for solar energy - with a surface area of 80-90 km2, the amount of energy currently produced can be generated. Sunlight is also universal - it can be used as heat, and can be used to produce large amounts of mechanical and electrical energy.

The disadvantage of solar energy - as is typical of all alternative energy - is its constant compatibility. For example, solar radiation activity varies from 2.2 MWh / m2 per year depending on the latitude, and the daily fluctuations are even higher. Other shortcomings and consequences are listed below and must be taken into account.

Today, Uzbekistan has 1,136 thermal power plants with 3,800 boilers, thousands of kilometers of communication pipelines, which emit harmful substances into the atmosphere, combustion products, and require new investments.

Uzbekistan is a republic with more than 300 sunny days a year. The total capacity of solar energy is 95 billion. tons of conventional fuel, of which 1% is consumed by 10% of solar energy, which is comparable to the energy consumption of the whole of Uzbekistan.

The testing of photovoltaic power plants and solar water heaters in Uzbekistan within the framework of UNDP projects has confirmed the feasibility and feasibility of using such devices in remote areas.

Two foreign-made photovoltaic power plants have been installed in Karauzak and Takhtakor districts of Karakalpakstan, and 45 units manufactured by Tashkent's Foton have been installed in Kostruba koselka. facilitated. Now the population will be able to use the equipment, convert sunlight into electricity, watch TV, listen to the radio and pump drinking water from a depth of 20 m.

Currently, the coefficient of solar energy use in the country is much lower, 0.3%, when the geographical location and climatic conditions of the country allow to significantly increase this figure, as well as save a lot of gas, fuel oil, coal and other energy carriers. .

The main manufacturer of photovoltaic power plants and absorbers is Tashkent Production OJSC "Foton", which allows the company to introduce new technologies in the production of material and technical base and staff skills. The $ 350,000 project began in August 2003 and is nearing completion. Water heating and heating equipment is technically more complex. But they can also be reimbursed quickly and in full.

Types and characteristics of energy efficient buildings. Since the creation of the earth, man has used sunlight. Archaeological evidence suggests that humans chose a place to live, protected from cold winds and sunlight. Myths about the sun have been fabricated and deified. In ancient Egypt, Ra was considered the sun god. The first famous solar system is the statue of Amenhotepa III, which dates back to the XV century BC. The air and water cameras inside the statue set in motion a musical instrument that was blocked by sunlight. Helios was worshiped in ancient Greece. The name of this god is used today in many terms related to solar energy. In ancient Slavs, Dojdbog was deified as a source of sun, heat and light. In ancient times there were such mysterious structures that we can assume that today they are used as solar collectors.

The beginnings of architecture in Central Asia, especially in Uzbekistan, date back to the III century BC. Many buildings and structures built in the IX-X centuries

and preserved to our time are rightly considered the pinnacle of the art of construction, the buildings and structures built in the XVI-XVII centuries in Samarkand, Bukhara, Khorezm, Tashkent and other cities are high. from the school of architecture and construction, which clearly shows the harmony of form and spatial composition in buildings and structures, the internal and external environment, taking into account the natural-climatic and urban planning conditions.

Energy efficiency means, first of all, the relatively low consumption of energy consumption for a technological process in a building or production. Energy saving is about reducing energy consumption, while energy efficiency is about using energy more efficiently.

Energy efficiency and energy saving can reduce public utility costs, increase industrial productivity and competitiveness nationwide, limit greenhouse gas emissions, and reduce fuel costs for energy companies.

It is well known that the growth of the world's population and economic development are leading to an increase in the consumption of energy resources, an increase in demand for them and an increase in prices. At the same time, this is due to the depletion of the Earth's total ozone layer, pollution of the atmosphere from acidic residues, the formation of toxic substances as a result of secondary chemical reactions in all layers of the biosphere, pollution of oceans, surface water bodies and groundwater. disturbing the regional ecological balance and causing similar global environmental problems. Therefore, the importance of energy saving and efficiency will continue to grow.

According to the method of using sunlight in the design and construction of energy efficient buildings can be divided into the following two types [m]

Passive use of sunlight;

Active use of sunlight;

Passive use of sunlight can be divided into two types:

Direct sunlight is heated through windows or a winter garden (greenhouse) built into the south wall;

Indirect exposure to sunlight on a low-heat wall behind a south-facing window.

Methods of active use of sunlight can be divided into the following types:

1. Vertical reception of sunlight through a built-in collector or wall-mounted winter garden, greenhouse

2. Autonomous air-heat collectors receive sunlight at an angle;

3. Air circulation with mechanical contour and heat gal accumulators;

4. Poor use of phytoelectric devices;

5. Angular and vertical reception of sunlight. In this case, the photo galvanic modules are placed on the roof, wall, roof wall;

6. Autonomous installation of devices. In this case, the modules are installed separately. In addition to the above, buildings in European countries are divided into the following four classes according to the amount of heat used to heat residential buildings. These indicators are given in Table 1.2.

Accommodation is classified according to heat needs

Accommodation category name	Heat consumption by European standards, 1 sq.m. per kilowatt hour per year	The proposed heat consumption for heating (Fig.) Is 1 sq.m. per kilowatt hour per year
An energy-efficient home	300	570
An energy efficient home with low heat demand	70	13
Energy efficient home with minimal heat demand	30	55
"Zero" heat-intensive energy-efficient house	less than 20	Less than 15

Today, in many countries, especially Germany, the German government is pursuing a consistent policy in the field of energy saving and alternative energy, where, despite significant economic growth, energy consumption has remained the same over the past decade. , a 3 percent decline in the utilities sector.

In determining the economically viable energy efficiency measures (heating, air permeability, heat protection, etc.) is determined the service life of the building before the overhaul (25-30 years). At the p level depends on how successfully you

solve a set of technical questions, these issues are related to the collection of heat energy, its transfer to the room, transformable heat shielding curtains.

KMQ "Building Thermal Physics", which is in circulation in our country today, measures the resistance to heat transfer. QMQ 2. 01 04-97 *. In the process, the external barrier structures were divided into three types according to the degree of thermal protection, and their thermal protection was increased by three times. This means that it is necessary to increase the energy efficiency of buildings, regardless of the use of renewable energy.

In the last fifteen to twenty years, in the years since our country gained independence, one of the main directions of the construction industry has been to increase energy efficiency.

The energy crisis of the 1960s and 1970s was driven by energy efficiency projects in existing and new buildings abroad. Since the 1970s, the thermal insulation of buildings' external barriers has doubled or tripled in Europe and other foreign countries.

Conclusions: Solar energy reserves are among the most unconventional sources of renewable energy. Solar energy has no negative impact on the environment. Due to the sharply continental climate of Uzbekistan, it is not advisable to use sun-drenched houses, including "stained glass walls" and other buildings used in foreign countries. If the "thrombus-walled" buildings for the climatic conditions of Uzbekistan are based on thermal and physical properties, it would be expedient to design energy-efficient buildings.

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